

acid group was 15 percent. In addition, half of the subjects in each group received an additional 3 g per day during colds. The average number of days of illness per cold was 13 percent less for these subjects than for those who did not receive this extra ascorbic acid.

Dr B. Elliott reported in 1973 on a double-blind study on a Polaris submarine. Half of the 70 subjects received 2 g per day of ascorbic acid and the others received a placebo. There was no consistent difference in days of morbidity with runny nose or sneezing, but the values for hoarseness, sore throat, non-productive cough, and productive cough were 63, 72, 60, and 69 percent, respectively, less for the ascorbic-acid subjects than for the control subjects.

All of the reported studies that have been carried out with ascorbic acid (or a placebo) given over a period of time to subjects exposed to colds in the ordinary way have led to the result that ascorbic acid, vitamin C, has some power of protection against the common cold. The reported decrease in illness for an intake of 1 to 3 g per day is between 15 percent and 65 percent.

We are justified in concluding from these investigations that ascorbic acid is effective in decreasing the incidence, severity, and integrated morbidity of the common cold.

#### Other Controlled Studies of Ascorbic Acid and the Common Cold

In addition to these studies, several other carefully controlled studies of ascorbic acid and the common cold have been carried out (Franz, Sands, and Heyl 1956, Wilson and Loh 1970, Glazebrook and Thompson 1942, Dahlberg, Engel, and Rydin 1944), with results in agreement with the conclusion that ascorbic acid provides protection against the common cold (Pauling 1971).

There is only one investigation that seems to give a contradictory result. This is the work of Walker, Bynoe, and Tyrrell (1967) of the Common Cold Research Unit, Salisbury, England. Of the 91 subjects, 47 received 3 g of ascorbic acid per day for 3 days before inoculation with viruses (rhino viruses, influenza B, or B814 virus) and for 6 days after inoculation, and 44 subjects received a placebo. The incidence of

colds was only 6 percent less for the ascorbic-acid group than for the placebo group. It is possible that the conditions of this study, involving introduction of a suspension of virus particles directly into the nose and throat of the subject, were so much different from the conditions of

ordinary exposure of persons to the viruses of the common cold, usually disseminated in the form of spray by the coughing or sneezing of persons with colds, that the results are not significant with respect to the question of whether or not ascorbic acid has protective effect for persons under ordinary conditions of exposure. It may be pointed out that the number of persons in the study and the short period of the study are such that a protective effect would have had to be larger than 40 percent in order to be statistically significant at the 0.05 level.

There is some evidence that an increased intake of ascorbic acid, 3 g to 10 g per day, taken regularly, leads to a decrease in incidence of the common cold by about 90 percent. This evidence has not been obtained, however, by the process of setting up double-blind trials. It was pointed out by one investigator that there is difficulty in carrying out controlled tests when the protective substance has a protective power as great as 90 percent, because the placebo subjects soon observe that they are not being protected, whereas some of the other subjects are being protected. Dr. Frederick R. Klenner, a physician who for 27 years has used ascorbic acid for the treatment of all virus infections, has recently (1971) made the following statement: "I have several hundred patients who have taken 10 g or more of vitamin C daily for 3 to 15 years. Ninety percent of these never have colds."

#### The Amelioration of the Common Cold

A paper reporting that ascorbic acid taken in proper amount at the first signs of a common cold decreases its severity in a significant way has been published by Dr. E. Regnier, a physician in Salem, Massachusetts. Dr. Regnier reported the results of a study of 137 colds, in 22 subjects, mostly physicians or other professional people, over a 5-year period. The subjects were given tablets of ascorbic acid or tablets of a placebo, to be ingested immediately at the first sign of a cold. The amount of ascorbic acid used was 600 mg, followed by an additional 600 mg of ascorbic acid every

three hours. Of 84 incipient colds treated in this way, only 8 developed into full-blown colds, whereas of 53 treated with the placebo, 50 developed into full-blown colds. Accordingly the investigator observed a 90-percent decrease in the number of colds in the ascorbic-acid subjects, as compared with the placebo subjects, under this treatment. The amount of ascorbic acid required was about 4 g per day.

Other investigators have also reported that a similar treatment is effective in stopping a cold. The American physician Dr. H. C. Wood, Jr. (1962) recommends taking 1,000 mg as soon as one says to himself, "I think I am catching a cold", followed by 500 mg of ascorbic acid every two hours during waking periods, for a total of 4 or 5 g per day. Irwin Stone (quoted by Pauling, Vitamin C and the Common Cold) recommends a succession of 1.5-g doses at 1-hour intervals, beginning at the first sign of a cold. All three report that the treatment is unsuccessful if it is delayed.

Several investigators have reported that the treatment of the common cold with ascorbic acid beginning after the cold has developed has given negative results. All of these investigators have, however, made use of smaller amounts than are recommended by Regnier, Wood, and Stone, and the first dose of ascorbic acid has been delayed for several hours. It is my opinion, from personal observation and from reports made to me by persons in close contact with me, that most colds can be stopped by the ingestion of ascorbic acid in sufficient amount, beginning immediately at the first sign of a cold.

### Conclusion

It has recently become evident that a number of controlled studies of the effect of ascorbic acid on the incidence, severity, and integrated morbidity of the common cold in populations receiving ascorbic acid regularly, beginning before colds have been incurred and with the subjects exposed to cold viruses in the ordinary way (contact with other people),

have given consistent results, showing that ascorbic acid has great value. The observations reject with high statistical significance the null hypothesis that under these conditions ascorbic acid has the same effect as a placebo. Ascorbic acid in the daily amount 200 mg decreases the incidence of colds and the severity of individual colds by about 20 percent, and decreases the integrated morbidity of the common cold by about 30 percent. In the daily amount 1,000 mg it decreases the incidence and the severity by about 30 percent, and the integrated morbidity by about 50 percent. No controlled study under these conditions has given results rejecting with statistical significance the hypothesis that this amount of protection occurs.

Moreover, a cold can be stopped or greatly decreased in severity by treatment beginning immediately after the first indication (sneeze, nasal secretion, chill) that the cold is beginning. The treatment required to stop the cold is the immediate ingestion of 500 or 1,000 mg of ascorbic acid, followed by an equal amount every hour.

There is some evidence that ascorbic acid in increased amounts has value also in providing protection against other diseases. Much of the evidence is quoted in a recent book by Irwin Stone (1972). Ascorbic acid may well be the most valuable of all the substances available for use in <sup>a</sup> ~~supplying~~ <sub>λ</sub> the principles of orthomolecular medicine.

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